

Vol'kenau N. A.

AUTHOR: Nesmeyanov, A. N., Academician 20-3-26/59
Vol'kenau, N. A., Vil'chevskaya, V. D.

TITLE: Intramolecular Acylation in the Ferrocene Series
 (Vnutrimolekulyarnoye atsilirovaniye v ryadu ferrotsena).
 The Cyclization of γ -Ferrocenyl Substituted Acids and
 Ketoacids (Tsiklizatsiya γ -ferrotsenilzameshchennykh kislot
 i ketokislot).

PERIODICAL: Doklady AN SSSR, 1958, Vol. 118, Nr 3, pp. 512-514 (USSR)

ABSTRACT: This kind of acylation was proved by the authors in the
 ferrocene series (ref. 1). The present work is an extension
 and continuation of it. By interaction between ferrocene and
 the anhydride of chlorine of β -carbomethoxypropionic acid
 β -carbomethoxypropionyl-ferrocene was produced and from this
 β -carboxypropionyl-ferrocene. With the latter substance no
 cycle could be formed by the action of polyphosphoric- or
 sulfuric acid. Then it was reduced to ω -carboxypropyl-
 ferrocene according to Klemmensen. This was easily cyclisated
 by heating with polyphosphoric acid. On this occasion keto-
 hydro-indenyl-cyclo-pentadienyl-iron was formed. Its structure
 was proved by: 1.- The production of a derivative after the

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Intramolecular Acylation in the Ferrocene Series.

20-3-26/59

The Cyclization of γ -Ferrocenyl Substituted Acids and Ketoacids

ketogroup; 2.- Bromination which lead to pentabromo-cyclopentan, that is to say a non-substituted cyclopentadienyl-ring was proved in the molecule; 3.- The infrared spectrum (1008 and 1106 cm^{-1}). Furthermore the cyclization with o-carboxy-benzoyl-ferrocene was investigated. Contrary to the ferrocenyl substituted keto acids of the aliphatic series o-carboxybenzoylferrocene can easily be cyclisated with polyphosphoric- and concentrated sulfuric acid. On the same conditions this occurs also with o-carbomethoxybenzoylferrocene. Thus a complete analogy with benzene derivatives is observed. As is known benzoyl-propionic acid can not be cyclisated while o-benzoyl-benzoe acid easily forms anthraquinone with simple heating. The results mentioned above prove the final conclusion (ref. 1) that ferrocenyl substituted carboxylic acids are subjected to an intra-molecular acylation and this in the same cyclopentadienyl ring which already contains a substituent. The same applies even for the o-carboxybenzoyl-ferrocene in which this ring is already somehow deactivated by the CO-group in it. β -carboxypropionyl ferrocene can not at all be

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Intramolecular Acylation in the Ferrocene Series. 20-3-26/59
The Cyclization of γ -Ferrocenyl Substituted Acids and Ketoacids

cyclisated. The reason for this has still to be found.
An experimental part with the usual data follows.
There are 4 references, 3 of which are Slavic.

ASSOCIATION: Institute for Elementary-Organic Compounds AN USSR
(Institut elementoorganicheskikh soedineniy Akademii nauk
SSSR).

SUBMITTED: August 10, 1957

AVAILABLE: Library of Congress

Card 3/3

NESMEYANOV, A.N., akademik; VOL'KENAU, D.A.; BOLENOVA, I.N.

Interaction of ferrocene with substituted aromatic compounds.
Dokl. AN SSSR 166 no.3:607-610 Ja '66.

(MIRA 19:1)

1. Institut elementoorganicheskikh soedineniy AN SSSR. Submitted
July 22, 1965.

L 42145-65 EPF(c)/EWP(j)/EWT(m) PC-4/Pr-4 RM S/0020/65/160/006/1327/1330
 ACCESSION NR: AP5007661

AUTHORS: Nesmeyanov, A. N. (Academician); Vol'konau, N. A.; Shilovtsova, L. S.

TITLE: Exchange of the ligand in replaced ferrocenes

SOURCE: AN SSSR. Doklady, v. 160, no. 6, 1965, 1327-1330

TOPIC TAGS: ferrocene, ligand, iodine, borate

ABSTRACT: The authors carried out reactions of mono- and 1,1'-diethylferrocenes, with benzene and mesitylene, of mono- and 1,1'-diacetylferrocene with mesitylene, and of monocyano-, monophenyl-, and 1,1'-diphenylferrocenes with benzene. As a result, they obtained a number of cations in the form of tetraphenylborates, tetrafluoroborates, and iodides. The decomposition temperature and melting points were determined for these compounds and were found to depend strongly on the rate of heating. The data obtained indicate that the substitutes in the ferrocene nucleus have a strong influence on the exchange of ligands. In the reaction with mesitylene, at 90-100C, 1,1'-diethylferrocene formed 32% ethylcyclopentadienyl-mesitylene iron, ferrocene yielded 20% cyclopentadienyl-mesitylene iron, and 1,1'-diacetylferrocene yielded 4% acetylcyclopentadienyl-mesitylene iron. At 120-130C the diethylferrocene fraction increased to 39% and the diacetylferrocene to 22%. At 50C diacetylferrocene did not react with mesitylene, and diethylferrocene formed only 9%
 Card 1/2

L 42145-65

ACCESSION NR: AP5007661

ethylcyclopentadienyl-mesitylene iron. Interaction between acetyl-ferrocene and mesitylene yielded a mixture of acetylcyclopentadienyl- and cyclopentadienyl-mesitylene iron. These could not be separated chromatographically. Fractional crystallization showed the content of the first to be 80-90%. These results show that for monoalkyl-ferrocene the substituted ring is exchanged chiefly, but for mono-acetylferrocene exchange is with the unsubstituted ring. Orig. art. has: 1 table.

ASSOCIATION: Institut elementoorganicheskikh soedineniy, Akademii nauk SSSR
(Institute of Hetero-Organic Compounds, Academy of Sciences SSSR)

SUBMITTED: 25Sep64

ENCL: 00

SUB CODE: 00, GC

NO REF SOV: 001

OTHER: 000

Card 2/2 CC

S/020/63/149/003/024/028
B117/B186AUTHORS: Nesmeyanov, A. N., Academician, Vol'kenau, N. A.,
Bolesova, I. N.

TITLE: Ligand exchange in ferrocene

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 149, no. 3, 1963, 615-618

TEXT: The replacement of a cyclopentadienyl ring by other ligands, performed for the first time, is described. When ferrocene is heated with aromatic hydrocarbons in the presence of aluminum chloride, one of the rings of the ferrocene core is replaced by an aromatic ring and a single charged cation of the aren-cyclopentadienyl iron is formed. Undesired oxidation of the ferrocene brought about by the $AlCl_3$ can be prevented by adding a reducing agent (aluminum powder). In this way tetraphenyl borates of the following compounds were produced: of benzene-cyclopentadienyl iron $C_{35}H_{31}BFe$, decomposition point $250-251^\circ C$; of mesitylene-cyclopentadienyl iron $C_{38}H_{37}BFe$, m.p. $257-258^\circ C$; of tetralin-cyclopentadienyl iron $C_{39}H_{37}BFe$,

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Ligand exchange in ferrocene

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m.p. 237.5-238.5°C. The reaction with naphthalene takes a similar course. The ligand exchange reaction also takes place for substituted ferrocenes, but is more complicated than with ferrocene. Heating diacetyl ferrocene with mesitylene in the presence of AlCl_3 gave the tetraphenyl borate of mesitylene-acetylcyclopentadienyl iron: $\text{C}_{40}\text{H}_{39}\text{OBFe}$, m.p. 197-198°C (decomposition point 199-200°C). The compounds produced are crystalline, yellow to light orange, highly soluble in acetone, dichloro ethane, acetonitrile, insoluble in alcohol, ether and benzene. As solids they are resistant to atmospheric oxygen. Decomposition, which soon occurs in organic solvents, is accelerated by light. Cations of the aren-cyclopentadienyl iron are fairly resistant to acids. The synthesis of iodides of benzene-cyclopentadienyl iron is described; it produced the following compounds: benzene-cyclopentadienyl iron triiodide, violet-red crystals, decomposition point 226-227°C. A black polyiodide of undetermined iodine content formed in the presence of iodine and KI (1:1). It was converted into triiodide by alcoholic KI as well as by reduction with a smaller amount of Na_2SO_3 . Energetic reduction of polyiodide and triiodide produced benzene-cyclopentadienyl iron iodide: $\text{C}_{11}\text{H}_{11}\text{FeI}$, yellow crystals, soluble

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Ligand exchange in ferrocene

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in water and alcohol, m.p. 230-230.5°C. Thermal decomposition of the tetraphenyl borates in vacuo produced ferrocene, some iron and, from the naphthalene derivative, also naphthalene, probably owing to cleavage of the aromatic hydrocarbon and disproportionation of the residue.

ASSOCIATION: Institut elementoorganicheskikh soedineniy Akademii nauk SSSR (Institute of Elemental Organic Compounds of the Academy of Sciences USSR)

SUBMITTED: February 18, 1963

Card 3/3

NESMEYANOV, A.N.; VOL'KENAU, N.A.

Some chromium arencarbonyls. Izv. AN SSSR. Otd. khim. nauk no.2:
367-368 F '61. (MIRA 14:2)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.
(Chromium carbonyl)

NESMEYANOV, A.N., akademik; VOL'KENAU, N.A.; BOLESOVA, I.N.

Exchange of ligands in ferrocene. Dokl. AN SSSR 149 no.3:
615-1618 Mr '63. (MIRA 16:4)

1. Institut elementoorganicheskikh soedineniy AN SSSR.
(Ferrocene) (Complex compounds)

VOL'KENAU, N.N., agronom, kand. nauk, red. VOLKOVA, M.I., st. red.

[Collection of research papers on agriculture] Sbornik
nauchno-issledovatel'skikh rabot po sel'skomu khoziaistvu.
Toms, Izd-vo Tomskogo univ., 1962. 89 p. (MIRA 16:3)

1. Tomskaya gosudarstvennaya sel'skokhozyaystvennaya opytnaya
stantsiya.

(Tomsk Province--Agriculture)

1. VOL'KENAU, V. A. Eng., SHAROTITS, A. N. Eng.
2. USSR (600)
4. Electric Lines
7. Insulation standards for 110-220 kilovolt electric transmission lines on metal supports.
Elek. sta. 23 No. 2, 1953.

9. Monthly List of Russian Accessions, Library of Congress, June 1953, Unclassified.

VOL'KENAU, V. A.

Subject : USSR/Electricity AID P - 2359
Card 1/1 Pub. 27 - 23/30
Authors : Vol'kenau, V. A. and Gershengorn, A. I., Engs.
Title : Certain characteristics of super-high voltage electric
power transmission lines (Review of foreign periodicals)
Periodical : Elektrichestvo, 5, 82-83, My 1955
Abstract : The authors summarize an article by R. G. Wolff in Modern
Power Engineering, v.47, No.2, 1953. Three tables, 1
reference.
Institution: None
Submitted : No date

VOL'KENAU, V.A., inzhener.

Cutting off small currents with high-voltage circuit breakers.
Elektrichrstvo no.2:84-86 F '56. (MLRA 9:5)
(Electric circuit breakers)

Z/019/61/018/011/005/005
D006/D102

AUTHORS: Bezrukov, F. V., Volkenau, V. A., Galkin, Yu. P., et al.

TITLE: Standard series of basic parameters of tube lightning-arresters

PERIODICAL: Přehled technické a hospodářské literatury, Energetika a elektro-
technika, v. 18, 1961, no. 11, 504, abstract # E 61-6968. Vestn.
Elektroprom. 31, December 1960, no. 12, 27-31

TEXT: The article presents a review of lightning-arrester types currently pro-
duced in the USSR, and lists additional types for 6 - 220 kV and 35-220 kV which
should be produced. The original article contains 6 tables. [Abstracter's note:
The above text is a full translation of the Czech abstract].

Card 1/1

PRUZHININA-GRANOVSKAYA, V.I., kand.fiz.-matem.nauk; VOL'KENAU, V.A., inzh.

Dependence of lagging voltages in a discharger on the length of
the current wave front. Elektrichestvo no.10:53-54 0 '61.
(MIRA 14:10)

1. Vsesoyuznyy elektrotekhnicheskii institut im. Lenina.
(Electric protection)


S/196/61/000/009/040/052
E194/E155

AUTHOR: Vol'kenau, V.A.

TITLE: The impulse transmission capacity of carborundum

PERIODICAL: Referativnyy zhurnal, Elektrotehnika i energetika,
no.9, 1961, 39, abstract 9I 248. (Vestn. elektroprom-
sti, ⁵²no.4, 1961, 48-51)

TEXT: To increase the current-carrying capacity of the
resistances in arresters, powder of electrical grade carborundum
(SiC) was studied to find how grain size, carborundum grade,
compressive forces acting on the grains, and methods of filling
the spaces between grains, affected the current-carrying capacity.
It is recommended to use coarse-grained high-electrical resistance
grades of carborundum in water. It is noted that increasing the
gas pressure in the pores between 0.1 and 10 atm increases the
current-carrying capacity under short transients and reduces it
under long; in gases of low electric strength the capacity under
short transients is reduced but remains unchanged under long
transients. Alteration in the mechanical pressure or
granulometric composition has little effect upon the non-linearity
Card 1/2



The impulse transmission capacity...

S/196/61/000/009/040/052
E194/E155

of the powder. The current-carrying capacity of the powder under short transients is considerably higher than that of 'Vilit' and 'Tervitov' discs made of this powder. For all methods of application, increase in the electrical conductivity of the carborundum powder increases the current-carrying capacity. 6 figures, 10 literature references.

[Abstractor's note: Complete translation.]

Card 2/2

VOL'KENAU, V.A., inzh.; GALKIN, Yu.P., kand.tekhn.nauk

Types of tubular and valve-type a.c. dischargers. Vest.
elektroprom. 33 no.5:79-80 My '62. (MIRA 15:5)

(Electric protection)

(Electric power distribution—Equipment and supplies)

VOL'KENAU, V. A.

" Conductivity of Carborundum."

Dissertation defended for the degree of Doctor of Technical Sciences,
at the All-Union Electrotechnical Institute, December 1962.

Moscow, Elektrichestvo, No.9 Sept pp 94-95.

L 27569-66 EWT(1)/FCC GW

ACC NR: AP6006728

(H)

SOURCE CODE: UR/0292/65/000/011/0033/0035

AUTHOR: Vol'kenau, V. A. (Candidate of technical sciences)

20

ORG: none

B

TITLE: Quality tests of valve-type lightning arresters

SOURCE: Elektrotehnika, no. 11, 1965, 33-35

TOPIC TAGS: lightning, lightning arrester

ABSTRACT: Existing Soviet standards on testing h-v lightning-arrester materials (tervit) have allowed the high probability that a considerable number of defective disks may remain undetected. It was experimentally found that one defective disk in the arrester unit caused (in 80-90% of cases) breakdown or flashover of the entire unit (which consisted of 3 parallel stacks, 8 disks in each). Hence, measures to improve testing methods were taken: a probability distribution curve for test-destroyed disks was determined; integral probability curves (0.01-sec current surge, 20 discharges) were plotted; a curve of guaranteed current-carrying capacity vs. variance was plotted; and heavier test currents were assigned. These steps enhanced the reliability of the quality-control process. Orig. art. has: 3 figures, 4 formulas, and 2 tables.

SUB CODE: 09 / SUBM DATE: none

Card 1/1

UDC: 621.316.933.6

VOL'KENAU, V.A., kand.tekhn.nauk

Control tests of valve-type dischargers. Elektrotekhnika
36 no.11:33-35 N '65.

(MIRA 18:11)

VOLKENS, N. V.

KOMAR, A. P., VOLKENS, N. V.

Relation of the Coercive Force and of the Magnetization of Ni_3Mn Alloy
to the Degree of Order of Atomic Distribution. ZhETF 11, 723, 1941.
Institute of Physico-Chemical Analysis 16, 105, 1943.

S/196/61/000/009/008/052
E194/E155


AUTHORS: Vol'kenshteyn, A.A., and Gavanin, V.A.

TITLE: The photometric characteristics of vacuum photocells illuminated by impulse lamps

PERIODICAL: Referativnyy zhurnal, elektrotekhnika i energetika, no.9, 1961, 5, abstract 9V 35. (Svetotekhnika, no.2, 1961, 12-18.)

TEXT: Vacuum photocells are often used in the photometry of impulse lamps. With impulse illumination the level of luminosity on the cathode may be higher than that at which anomalous effects occur in the operation of the vacuum photocell with constant illumination. This is attributed to formation of a space charge, to the low conductivity of the light-sensitive layer, and to secondary electron emission. The flash duration of various types of impulse lamp varies from fractions of a microsecond to thousands of microseconds. For the same illumination (candle-seconds) the instantaneous luminosities from such lamps differ by several orders. In the photometry of impulse lamps the type of vacuum photocell and its operating conditions must be so

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The photometric characteristics ...

S/196/61/000/009/008/052
E194/E155

selected that anomalous effects do not occur within the range of measurement. Therefore a linear relationship should be maintained between the light magnitudes which govern the conditions of illumination of the photocell (the amount of illumination, the peak or mean illuminance during the flash time) and the electrical values which characterise the passage of current in the photoelectric cell circuit during the flash (the quantity of electricity, the peak value of the photo current). The characteristics of vacuum photocells are given in the form of graphs and tables.
8 figures, 3 literature references.

[Abstractor's note: Complete translation.]

Card 2/2

VOL'KENAU, V.A., inzh.

Device for controlling and testing the elements of valve
dischargers. Elektrotehnika 34 no.10:72-73 0 '63.

(MIRA 16r11)

1ST AND 2ND ORDERS																									
PROCESSES AND PROPERTIES INDEX																									
<p>Visual photometric measurements at low brightnesses. A. A. Volkenshtein and A. A. Gershun. <i>Doklady Akad. Nauk S.S.S.R.</i> 66, 50-51 (1949). - In making visual measurements of low brightnesses, the following should be observed: (1) it should be detd. first whether the photometer is designed and graduated for measuring brightness or equiv. brightness; (2) in measuring equiv. brightness of light of any spectral compn., a photometer should be used in which the equalization of the photometric fields is obtained by changing the brightness of the field of comparison of the photometer while the brightness of the measured light is not changed during the photometering; and (3) in measuring brightness, a photometer with any system of equalization of the photometric fields can be used but it should be graduated against light of the same spectral compn. as that being measured. In measuring the relative values of brightness of light of an arbitrary but equal (for all comparative measurements) spectral compn. photometers should be used in which the light balance is obtained by decreasing the brightness of the measured light while the brightness of the inner field of comparison is unchanged.</p> <p>B. Z. Kamich</p>																									
<p>ASB-31A METALLURGICAL LITERATURE CLASSIFICATION</p>																									
<p>GROUPS OF MATERIALS</p>																									

52/49T82

USSR/Medicine - Vision, Physiology
Medicine - Lights, Effects

May 49

"Changes in Spectral Sensitivity of the Eye
During Short-Duration Illumination," A. A. Vol'-
kenshteyn, State Opt Inst, 3 pp

"Zet. Ak. Nauk SSSR," Vol. LXVI, No 2

Visual reception of flashes of white light has
been studied in detail by various authors, and
results of their investigations have proved
applicable to solution of practical problems.
Action of a colored flash on the eye has been
studied in many papers, but experimental data
obtained leads to contradictory conclusions.

52/49T82

USSR/Medicine - Vision, Physiology
(Contd.)

May 49

Describes experiments to determine minimum illumina-
tion, corrected by point flashes of a monochro-
matic light source, at which an observer can see
the light from this source. Established that
character of dependence of eye sensitivity on wave
length changes during transition from prolonged-
length to short-duration illumination. Submitted by
Acad A. N. Torenin, 11 Mar 49.

52/49T82

VOLKENSHTEYN, A. A.

PA 240T105

USSR/Physics - Light Measurement

Dec 52

"Optical Method of Measuring Intensity of Light,
Brightness and Flux," A. A. Volkenshteyn, D. I. An-
dreyev and V. I. Isayenko

"Zhur Tekh Fiziki" Vol 22, No 12, pp 2026-2037

Optical measuring method was tested theoretically
and experimentally. Results showed adequate ac-
curacy of measurements. The equipment may be used
in plants and on expeditions. Received 22 Sep 52.

240T105

U S S R

2

1121. Method of determining the light characteristics of incandescent lamps as function of the voltage. A. A. Vol'kenshteyn. *Elektrichestvo*, 1954, No. 11, 73-6. In Russian.

As the exponential relationships mostly used for determining incandescent lamp characteristics in terms of voltage do not furnish correct data, the colour temperature of the radiation may be chosen as an alternative reference basis. The curve of the luminous output then becomes parabolic if the characteristics of main interest are brightness, luminous flux and service life of the lamp. Also, the radiation of bodies consisting of the same material having the same surface finish is only a function of their temperature. In the case of tungsten, the usual filament material, the transition from true to colour temperature is not difficult, because this relation is well known and is nearly linear in the range 2000-3500°K. The colour temperature is easier to measure and enables in some cases lamp characteristics to be obtained from the laws of black-body radiation applied to the well-known tungsten radiation characteristics. The author shows that his method, based on the above principles, yields results in satisfactory agreement with experimental data obtained by other workers.

D. P. KRAUS

VOL'KENSHTEYN, A.A., kand.tekhn.nauk

In regard to S.G.IUrov's article "General scheme for the construction of photometric magnitude systems." Svetotekhnika 5 no.9:26-28 S '59. (MIRA 13:2)

1. Gosudarstvennyy opticheskiy institut.
(Photometry) (IUrov, S.G.)

VOL'KENSHTEYN, A. A.

U S S R .

10918. Peculiarities of visual photometry in the range of low brightness. A. A. Vol'kenshteyn. *Zh. tekhn. Fiz.*, 24, No. 4, 622-35 (1954) in *Russ. Rev.*

The problem in practical photometry is often complicated by the difficulties introduced by colour differences of the light which become more accentuated in the low brightness range. It is impossible to refer photometric measurements at different wavelengths to each other without a more or less artificial standard for calibration, and the establishment of such a standard in itself has to take the spectral sensitivity of the eye into account. The latter is different for normal and very low light levels, as represented by two distinct "standard luminosity functions." Certain conditions have also to be observed in the establishment of optical equilibrium between the external and internal radiant fields to be compared, e.g. that the diameter of the exit pupil of the instrument must not be smaller than the diameter of the observer's pupil in dark adaptation (8 mm). Equivalent brightness curves v. standard luminance can be obtained for various colours if the curves of spectral transmission of the filters used and of the spectral absorption of the sources of light are available. The spectral transmission curves of the filters are used for obtaining their equivalent transmission coefficients. Owing to differences in the angular accommodation of the human eye to relative brightness differences, certain shapes and dimensions of the optical (photometrical) fields are also more favourable than others.

B. P. KRAUSE

VOL'KENSHTEYN, A.A., kandidat tekhnicheskikh nauk; TARKHOVA, A.A.,
inzhener

New photometer track. Svetotekhnika 1 no.1:19-21 F '55.
(MLRA 8:9)

1. Gosudarstvennyy opticheskiy institut
(Photometry)

VOL'KENSHTEYN, A.A., kandidat tekhnicheskikh nauk

Photometer for the measurement of low intensity brightness.
Svetotekhnika 1 no.4:1-4 Ag '55. (MLRA 8:9)

1. Gosudarstvennyy opticheskiy institut
(Photometry)

VOL'KENSETEYN, A.A., kandidat tekhnicheskikh nauk

Calculations in the field of low intensity brightness. Svetotekhnika
1 no.5:7-11 0'55. (MIRA 8:12)

1. Gosudarstvennyy opticheskiy institut
(Lighting)

VOL'KENSHTEYN, A. A.
USSR/Physics - Optics

FD-3116

Card 1/1 Pub. 153 - 15/24

Author : Vol'kenshteyn, A. A.

Title : Addition of small brightnesses

Periodical : Zhur. tekhn. fiz., 25, No 6 (June), 1955, 1100-1104

Abstract : The author experimentally shows that under the conditions of the conducted experiments the special law of the addition of equivalent brightnesses is observed within the limits of errors of measurements for an extensive region of small brightnesses and for light of various spectral composition. He thanks M. I. Golland, Ye. I. Dikan', P. P. Zakharov, and Ye. O. Fedorova for their help. Six references: e.g. A. A. Vol'kenshteyn and D. I. Andreyev, Probl. fiziolog. optiki, 8, 55-68, 1953; S. G. Yurov, Probl. fiziolog. opt., 10, 59-62, 1952.

Institution :

Submitted : September 8, 1954

GERSHUN, Andrey Aleksandrovich; ~~VOLKENSHTEYN, A.A.~~; GUREVICH, M.M.;
LAZAREV, D.N.; FEDOROVA, Ye.O.; ORLOVA, L.I., red.;
POL'SKAYA, P.G., tekhn. red.

[Selected papers on photometry and illuminating engineering]
Izbrannye trudy po fotometrii i svetotekhnike. Moskva, Gos.
izd-vo fiziko-matematicheskoi lit-ry, 1958. 548 p. (MIRA 11:9)
(Photometry (Lighting)

VOL'KENSHTEYN, A.A., kand.tekhn.nauk; KUVALDIN, E.V., inzh.

Photometric evaluation of directed light impulses. Svyetotekhnika
10 no.2:15-17 F '64. (MIRA 17:4)

1. Gosudarstvennyy opticheskiy institut.

L 07049-67 ACC NR: AP6027128	EWT(1)/EEG(k)-2/EWP(k) (A)	IJP(c) WG/GG	SOURCE CODE: UR/0311/66/000/006/0022/0024
AUTHOR: <u>Vol'kenshteyn, A. A.</u> (Candidate of technical sciences); <u>Yefremov, V. P.</u> (Engineer); <u>Kuvaldin, E. V.</u> (Engineer); <u>Matveyeva, O. K.</u> (Engineer); <u>Sazonov, V. M.</u> (Engineer)			
ORG: None			
TITLE: Photometric equipment for pulsed light sources			
SOURCE: Svetotekhnika, no. 6, 1966, 22-24			
TOPIC TAGS: photometer, light pulse, laser pulsation, flash lamp			
ABSTRACT: A unit for photometric measurement of pulsed light sources is described. This unit consists of three instruments: an <u>FIL</u> photometer for flash lamps, an <u>FML-m</u> photometer for lasers and a <u>KOS</u> standard light pulse generator. The <u>FIL</u> photometer may be used for measuring nearly all types of industrial flash tubes and the <u>FML-m</u> is used for measuring the radiation from free-emission lasers. The <u>KOS</u> instrument generates reproducible standard light pulses and is used for calibration of the two photometers. Photographs of each of the component instruments are given together with brief descriptions. The flash tube photometer may be used for measuring the luminous intensity of a light source with a maximum transverse dimension of 110 mm. The fundamental scale of the instrument has graduations of 100 candles/div, 10^5 nits/div and			
Card 1/2			UDC: 535.242.2

L 07949-67

ACC NR: AP6027128

5
 10^{-3} ca·sec/div. These graduations may be expanded by five orders of magnitude for measuring higher intensities by changing the resistance of the load on the photocell or by using neutral light filters. The time characteristics of the instrument are: least resolved duration of the leading front -- $5 \cdot 10^{-7}$ sec, pulse duration -- no more than 10^{-2} sec. The approximate value of a graduation on the FML-m photometer is 1.0 w and 10^{-4} joules per unit of the reference scale. The upper limits of measurement are 10^8 w and 10^3 joules. The unit may be used for laser measurements in the 400-1100 nm spectral region. The time resolution of the photocell is a few tenths of a microsecond. The KOS instrument generates pulses with a duration of approximately 3 μ sec and a luminous intensity of 200,000 ca. The authors consider it their pleasant duty to mention the considerable part played by N. F. Shipul', L. I. Mel'nikova, R. V. Tsyvkin, V. M. Shpan'kov and V. N. Kornilov in development of this photometric equipment. Orig. art. has: 3 figures.

SUB CODE: 13, 20/ SUBM DATE: None/ ORIG REF: 005

Card 2/2 *XC*

VOL'KENSHTEYN, Andrey Aleksandrovich; GORODINSKIY, G.M., nauchn.
red.; VAYTS, V.M., red.

[Visual low-brightness photometry] Vizual'naya fotometriia
malykh iarkostei. Moskva, Energiia, 1965. 141 p.
(MIRA 18:4)

VOL'KENSHTEYN, A.A.; GORODINSKIY, G.M.; GUREVICH, M.M.; GUREVICH, N.N.;
GUSEV, N.M.; KOZLYANINOV, M.V.; LAZAREV, D.N.; LEVITIN, I.B.;
MESHKOV, V.V.; POPOV, O.I.; SAMSONOVA, V.G.

Andrei Aleksandrovich Gershun. Svetotekhnika 8 no.12:1-3 D '62.

(MIRA 16:1)

(Gershun, Andrei Aleksandrovich)

VOL'KENSHTEYN, A.A., kand.tekhn.nauk; GAVANIN, V.A., inzh.

Photothermal characteristics of vacuum phototubes with illumination
by flashtrons. Svetotekhnika 7 no.2:12-18 F '61. (MIRA 14:10)

1. Gosudarstvennyy opticheskiy institut i Moskovskiy elektrolampovyy
zavod.

(Photoelectric cells)

S/196/62/000/012/008/016
E194/E155

T: //

AUTHOR: Vol'kenshteyn, A.A.

TITLE: An optical method of increasing the contrast on
cathode-ray tube screens

PERIODICAL: Referativnyy zhurnal, Elektrotekhnika i energetika,
no.12, 1962, 2, abstract 12 V10. (Svetotekhnika,
no.2, 1962, 17-20)

TEXT: The visibility of an image on a screen of a cathode-
ray tube may be improved by increasing the contrast between the
image and background by means of a light filter fitted between
the observer and the screen. The table gives calculated values
of contrast for white radiation of a television screen ($\rho = 0.6$)
with external lighting by incandescent lamps. If the spectral
regions in which the radiations from the screen and from the
external lighting are concentrated are sharply delineated, it is
advisable to use selective light filters. Polaroid films can
sometimes be used to limit access of outside light to the screen.
The contrast can also be increased by reducing the scatter of
light caused in the tube and in the thickness of its glass face by
Card 1/ 2

An optical method of increasing the ... S/196/62/000/012/008/016
E194/E155

multiple reflection of the actual radiation of the screen.
2 illustrations. 8 literature references.

ASSOCIATION: Gosudarstvennyy optich. in-t, Leningrad
(State Optical Institute, Leningrad)

Transmission factor of neutral light filter τ	Image brightness in n.t.	Illuminance of screen from external source. lux.			
		0	100	300	3000
		Contrast			
1	100	1	0.83	0.62	0.14
0.6	60	1	0.94	0.85	0.36
0.3	30	1	0.97	0.92	0.53
0.1	10	1	0.99	0.97	0.77

Abstractor's note: Complete translation.

Card 2/2

VOL'KENSHTEYN, A. A., kand.tekhn.nauk.

Transmittance coefficient of selective filters in mesopic vision.
Svetotekhnika 6 no.9:8-13 S '60. (MIRA 13:9)

1. Gosudarstvennyy opticheskiy institut.
(Light filters)

VOL'KENSHTEYN, A.A., kand.tekhn.nauk; OSHMARIN, A.G., inzh.

VFM-57 visual laboratory photometer (for low brightness). Svetotekhnika
4 no.12:19-21 D' 58. (MIRA 11:12)
(Photometers)

VOL'KENSHTEYN, A.A., kand. tekhn. nauk.

Summation of small luminosities. Svetotekhnika no.1:18-24 Ja '59.
(MIRA 12:1)

1.Gorudarstvennyy opticheskiy institut.
(Photometry)

VOLKENSHITEYN, A. S.

Synthesis of α, β -dichlorobutadiene and its polymerization. A. L. Klebanov, A. S. Volkenshtein and A. P. Olova. *J. Gen. Chem.* (U. S. S. R.) 5, 1245-47 (1935).

Attempts to obtain $\text{CH}_2\text{CHClCHClCH}_2$ (I) from $\text{CH}_2\text{CHClCH}_2$ (II) directly with SbCl_5 in the presence of CHCl_3 (III) resulted in little I and considerable tetrachloride. The best results were obtained by converting II with NaClO to $\text{CH}_2\text{CHClCHClCH}_2$ (III) and this with HCl to I under the following optimum conditions. III, b. 55-7°, d₄ 1.021, d₂₀ 1.014, n_D 1.4098, M. R. 23.61, exaltation 0.64, was obtained in 57% yield by mechanically shaking for 16 hrs. II with NaOCl contg. 15% NaOH . Several months after this work was completed Jacobson and Carothers (*C. A.* 28, 964) reported that by a similar process they obtained III in 10% yield, possessing extremely explosive properties. This may be explained by contamination of their product with Cl derivs. of C_4H_6 . I, b. 60-5°, d₄ 1.207, n_D 1.5078, M. R. 30.47 (obs.), 20.472 (calcd.), exaltation 0.99, was obtained in 56% yield when 139 g. HCl (d. 1.19) satd. with HCl to 50-55% concn. was treated with 80 g. III, 23.2 g. CuCl and 4 g. NH_4Cl and then allowed to stand for 16 hrs. I is spontaneously polymerized to a rubber-like substance which on vulcanization gives an ebonite-like substance. Twenty literature references. C. B.

ASAC-55A METALLURGICAL LITERATURE CLASSIFICATION

VOL'KENSHTEYN, A. S.																										PROCESSES AND PROPERTIES HERE																									
<p>co</p> <p>The conditions and methods for the preparation of glycerol trichlorohydrin from propylene chloride. A. L. Kichanski and A. S. Vol'kenshtein. <i>J. Applied Chem.</i> (U.S.S.R.) 8, 106-10 (1955). Checking various known methods for the prepn. of glycerol trichlorohydrin by chlorinating propylene chloride in the presence and absence of various catalysts a very complex mixt. of various products contg. mainly 1,1,2-trichloropropane is obtained, while trichlorohydrin is obtained in a very contaminated state and in small quantities. In the splitting of HCl from propylene chloride by means of catalysts and bases α-chloropropene and propadiene are obtained. Sixteen references. A. A. Bochtlingk</p>																										10																									
AS & SLA METASUMMAL LITERATURE CLASSIFICATION																										67																									

15042

VOL'KENSHTEYN, B. M.

USSR/Sugar 4304.0300

Oct 1947

"Instructions on Accounts between Plants Concerning Beets Which Have Been Turned Over for Further Processing," B. M. Vol'kenshteyn, Dzhambul Sugar Refinery, 3 pp

"Sakhar Prom" Vol XX, No 10

Main Administration of Sugar Industry (Glavsakhar) issued new instructions on order of transfer and accounts between sugar refineries and beet storage bases (sveklobazi). Instructions concerned shipping sugar beets for further processing, but were worked out on a high level and lacked certain practical operational qualities. Author suggests detailed changes in these instructions.

LC

15042

VOL'KENSHTEYN, B.M.

Sugar Industry

Analysis of production cost of granulated sugar. Sakh.prom 26 No. 9, 1952.

9. Monthly List of Russian Accessions, Library of Congress, December 1952 ~~1951~~, Uncl.

VOL'KENSHTEYN, B.M.

Methods of analyses for determination of sugar losses in beets.
Sakharnaya Prom. 26, No.11, 29-32 '52. (MLRA 5:12)
(CA 47 no.13:6688 '53)

VOL'KENSHTEYN, B. M.

Beets and Beet Sugar - Transportation

Charges for automotive transportation of sugar beets. Sakh. prom. 27, No. 3, 1953.

9. Monthly List of Russian Accessions, Library of Congress, June 1953. Unclassified.

VOL'KENSHTEYN, B.M.

Erroneous suggestion (variation in the rendement of brown sugar). Sakh.
prom. 27 no.4:38 Ap '53. (MLEA 6:6)

1. Karlamanskiy sakharnyy zavod.

(Sugar industry)

CA 4

Modern viewpoints on the mechanism of electric discharge in solid dielectrics. P. P. Vol'kenshteyn. *J. Tech. Phys. (U. S. S. R.)* 5, 583-611(1935).—A review covering thermal and elec. discharge, the role of electrons and ions, old and modern views, the theories of Zenner, Fowler, Frolch, Prentzel and a discussion of discharge as a Stark effect. P. H. Rathmann

ASU-SLA METALLURGICAL LITERATURE CLASSIFICATION

Electronic conductivity of dielectrics in strong fields.
F. P. Volkonskiy. *J. Tech. Phys.* (U.S.S.R.) 9, 171-
177 (1939).—Three mechanisms of the ionization of di-
electrics, namely that by impact, that by emission and that
due to Stark effect are considered. The results are used
for discussion of the elec. breakdown. J. F. B.

CA

Electron processes in real crystals. P. F. Volkonskiy.
Uspekhi Fiz. Nauk (Progress Phys. Sci.) 28, No. 4, 389
37(1946); *Chem. Zentr.* 1947, II, 7; *cf. C.A.* 42, 5340i,
6628e; 43, 7767i.—A comprehensive crit. review.
M. G. Moore

CA

2

Vol'kovich, P. I. Elektroprovodnost Poluprovodnikov (Electric Conductivity of Semiconductors). Moscow: OGIZ. Gosudarst. Izdatel. Tekh.-Teoret. Lit. 1947. 352 pp. R12 Kop. 25. Reviewed in *Uspekhi Fiz. Nauk* 34, 401 (1948).

COMMON ELEMENTS										PROCESSING AND PROPERTY INDEX										1ST AND 2ND CODES									
<p><i>ca</i></p> <p>Interaction of adsorbed molecules and the theory of adsorption on inhomogeneous surfaces. P. P. Vol'kenshtein (Acad. Sci. U.S.S.R., Moscow). <i>J. Phys. Chem. (U.S.S.R.)</i> 21, 103-78(1947).—If it is assumed that the adsorbent surface is plane and uniform, the adsorption layer unimol., and the deviations from Langmuir's elementary theory are due to interaction of adsorbed mols. only, then the laws of this interaction can be derived from the empirical adsorption isotherm. E.g., Freundlich's isotherm is obtained when the adsorbed mols. repel one another with a force that is a linear function of the log of their mutual distance. Roginskii (C.A. 40, 4931¹) calcd. the inhomogeneity of adsorbent surfaces under the assumption that there is no interaction between adsorbed mols. Since any isotherm can be accounted for either by Roginskii's or by the present hypothesis, there exists a definite correlation between the laws of mol. interaction and the distribution of inhomogeneities. This correlation is calcd. for several instances.</p> <p>J. J. Bikerman</p> <p><i>2</i></p>										COMMON VARIABLES INDEX																			
ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION																													
FROM SYNDICATE										FROM SYNDICATE										FROM SYNDICATE									
GROUPS										GROUPS										GROUPS									
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z										A B C D E F G H I J K L M N O P Q R S T U V W X Y Z										A B C D E F G H I J K L M N O P Q R S T U V W X Y Z									

32

Electron Levels of Atoms Adsorbed on Crystal Sur-
 faces. I. F. F. Vol'kenshtein. *Zhurnal Fizicheskoi
 Khimii* (Journal of Physical Chemistry), v. 21, Nov.
 1947, p. 1317-1334.
 The adsorbed atoms and the lattice of the adsorb-
 ent were considered to be a single quantum-me-
 chanical system. Electron levels and corresponding
 wave functions were calculated. Criteria of "physi-
 cal" and "chemical" adsorption were investigated.

COMMON ELEMENTS
 MATERIALS INDEX
 OPEN
 METALLURGICAL LITERATURE CLASSIFICATION
 TECHN DOMINANT
 SUBJECT LETTERS

Electron theory of promoting and poisoning ionic catalysts. P. P. Vol'kenshtein (Inst. Phys. Chem., Acad. Sci. U.S.S.R., Moscow). *J. Phys. Chem. (U.S.S.R.)* 22, 311-30(1948) (in Russian); cf. *C.A.* 42, 6340i.-
Math. The discover. of adsorbed mols. A_1 and B_1 is supposed to be an essential stage in the heterogeneous reaction $A + B = 2AB$ on the surface of an ionic crystal. This surface is treated as a semiconductor in which the adsorbed mols. are admittants. In the system thus formed, the above discover. is a result of interaction between the mols. and the electrons and holes of the crystal lattice. The rate of chem. reaction depends on the numbers of the electrons and the holes, and these numbers depend on the surface concn. of the promoters or poisons present. Thus it is shown why small amts. of a foreign substance often increase, and larger amts. reduce, the catalytic activity. The temp. coeff. of this activity also is given by the theory.
J. Bikerman

ASME: 3.1 METALLURGICAL LITERATURE CLASSIFICATION

CIA-RDP86-00513R001860510016-3"

VOL'KENSHTEYN, F.F.

Certain adsorption peculiarities conditioned by "thermal disorder" on
crystal surfaces. Probl.kin.i kat. 7:360-382 '49. (MIRA 9:9)
(Adsorption) (Thermal analysis) (Crystallochemistry)

1ST AND 2ND ORDERS																										3RD AND 4TH ORDERS																									
1ST AND 2ND ORDERS																										3RD AND 4TH ORDERS																									
1ST AND 2ND ORDERS																										3RD AND 4TH ORDERS																									
<p>73</p> <p>22</p> <p>Electroconductivity of Nonmetallic Crystals. (In Russian.) F. F. Vol'kenshtein. <i>Uspekhi Khimii</i> (Progress in Chemistry), v. 18, May-June 1949, p. 288-301. Critically analyzes electrical properties of non-metallic crystals from the point of view of contemporary physical theory. Analysis includes explanation of electrical, photoelectric, and, in general, macroscopic properties of solid crystalline bodies. 16 ref.</p>																																																			
<p>ASME SLA METALLURGICAL LITERATURE CLASSIFICATION</p>																																																			
<p>1ST AND 2ND ORDERS</p>																																																			
<p>3RD AND 4TH ORDERS</p>																																																			

VOL'KENSHTEIN, F. F.

Vol'kenshtein, F. F., Concerning certain peculiarities of adsorption due to a "heat disorder" on the surface of the crystal. P. 917

The adsorption of gas molecules on the surface of a crystal for the case where the number of adsorption centers changes with temperature is examined. The adsorption centers are treated as defects of the surface, that is, as local disturbances of the periodic structure of the lattice. The kinetics of adsorption under definite conditions will be exactly the same as in the case of the so-called "activated" adsorption, although the activating barrier is absent. The isotherm of adsorption is of type Q~p. The differential adsorption heat is a function of filling, although the surface is homogeneous in energy and the interaction between the adsorbed molecules is disregarded.

Inst. of Physical Chemistry
Dept. of Catalysis and Topochemistry
Acad. of Sci., USSR
Moscow
July 14, 1948

SO: Journal of Physical Chemistry, (USSR) 23, No. 8, (1949)

CA

Characteristics of adsorption brought about by "thermal
disorders" on the surface of crystals. F. F. Vol'manski
(Inst. Phys. Chem., Acad. Sci. U.S.S.R., Moscow).
Guide to Russ. Sci. Periodical Lit., Brookhaven Natl. Lab. 3,
281-63(1950) (Engl. translation).—See C.A. 44, 18c.
E. J. C.

VOL'KENSHTEYN, F. F.

168 T91

USSR/Physics - Electrons
Crystals, Ionic

Jul 50

"Behavior of Electrons in Ionic Crystals," F. F.
Vol'kenshteyn, V. L. Bonch-Bruyevich, Inst of Phys
Chem, Acad Sci USSR

"Zhur Eksper i Teoret Fiz" Vol XX, No 7, pp 624-635

Considers ionic crystal containing "excess" electrons (conduction electrons). Behavior of these electrons is considered to be multi-electron problem and is solved completely for case of two "excess" electrons. Shows that among possible states of system there exist states corresponding to individual and paired electrons. Submitted 19 Dec 49.

168T91

C.A

2

Effect of small quantities of impurities on the catalytic activity of ionic catalysts. F. F. Vol'kenshtein (Inst. Phys. Chem. Acad. Sci. U.S.S.R., Moscow). *Zhur. Fiz. Khim.* 24, 1068-82 (1950).—The catalyst surface is treated as a two-dimensional semi-conductor (Tamm levels, cf. V. G. A. 42, 6628e). Chemisorbed atoms or molecules and promoters or poisons are characterized by impurity levels lying between the valence and the conduction band. They are ionized to a certain extent depending on the Fermi level of the system. The latter depends on the no. of impurities of both kinds, donors and acceptors, and on the temp. When increasing amts. of a donor are adsorbed on the surface, the degree of ionization of the donor decreases with coverage. This decrease corresponds to the interaction between adsorbed species. Quite generally, the degree of ionization of acceptors increases under the influence of increasing amts. of donor impurities, and vice versa for acceptor impurities. The degree of ionization may be expressed as a function of η , the no. of electrons in the conduction band. These principles lead to the computation of the rate of a catalyzed

reaction as a function of η and of the various parameters defining the spectrum of the semiconductor. The assumptions are (1) the reaction involves one (or several) acceptor species and one (or several) donor species; (2) the surface is only sparsely covered with reactants; (3) only neutral reactants take part in the reaction; ionized reactants do not react. Then the rate first increases with increasing η but later decreases with η when η keeps on increasing. Impurities of both kinds affect the reaction rate. A given impurity first acts as a promoter at small concns. but as a poison at larger concns. The theory is not, however, a complete theory of catalyst modification, since it does not consider the detailed mechanism of the activation of reactant species; it describes the effect of the surface on the frequency factor but waives the activation energy. The reaction rate also increases at first with bulk cond., then slows down for larger values of the cond. (n -type in the present case). No data are given in support of the theory but expts. are suggested to check the relation found between cond. and catalytic activity. Michel Boudart

VOL'KENSHTEIN, F. F.

"Some problems of contemporary solid state electron theory," Zh.
Tekh. Fiz., vol. 21, 1951, p. 1544 (23 pp.)

B-84049, 7 Apr 55

VOL'KENSHTRYN, F. F.

PA 194T16

USSR/Chemistry - Modification of Catalysts Oct 51

"Modification of Catalysts," F. F. Vol'kenshtsyn, Inst of Phys Chem, Acad Sci USSR

"Zhur Fiz Khim" Vol XXV, No 10, pp 1214-1227

Devoted to phenomenon of modification of catalysts (i.e., promotion by poisons, poisoning by promoters), which was discovered in 1940 at Div of Catalysts and Topochem, Inst of Phys Chem, Acad Sci USSR. Compares theoretical and exptl material on relation between activity of nonmetallic cryst catalysts (which are semiconductors) and

194T16

USSR/Chemistry - Modification of Catalysts (Contd) Oct 51

their elec cond and treats dependence of elec cond (thus also catalytic activity) on concn of admixts and temp. Theory, though in satisfactory qual agreement with expt in respect to nonmetal catalysts, does not apply to metal catalysts.

194T16

17 T76

VOLKENSHTEIN, F. F.

USSR/Physics - Theory of Solid Body Jan/Feb/Mar 51

"Zone Theory of Solid Body and Limitations of Its Applicability," F. F. Volkenshtein

"Uspekhi Fiz Nauk" Vol XLIII, No 1, pp 11-29

Outlines basic preliminary assumptions of zone structure, limitations of applicability to metallic and nonmetallic crystals, lattice "disorder" and its effect on zonal structure, representation of polarons, excitons and doublons. Explains why an incorrect theory (Bloch, Sommerfeld) nevertheless gives good results.

17T72

USSR/Physics - Semiconductors, Mar/Apr 52
Behavior of Electrons

"The Behavior of Electrons in Ionic Crystals,"
F. F. Vol'kenshteyn, L. Bonch-Bruyevich

"Iz Ak Nauk SSSR, Ser Fiz" Vol XVI, No 2, p 231

Abbreviated text of report, published in "Zhur
Eksper i Teoret Fiz" 20, 624, 1951. Behavior of
2 electrons in an atomic chain is analyzed from
the Heitler-London viewpoint. It is shown that
despite states corresponding to independent
motion of both electrons, forming the usual zone,

220T103

still 2 other zones of so-called "doublet" states
exist. In these states the wave-function de-
creases exponentially with distance between the
electrons.

220T103

VOL'KENSHTEYN, F. F.

VOLKENSHTEYN, F. F.

USSR/Nuclear Physics - Ionic Crystals Feb 52

"Problem Concerning the Behavior of Electrons in Ionic Crystals," F.F. Volkenshteyn, Inst of Phys Chem

"Zhur Eksper 1 Teoret Fiz" Vol XXII, No 2, pp 184-193

Analyzes behavior of 2 "excess" electrons in ionic lattice as a multi-electron problem, i.e., outside the zone theory. Obtains 2 different states: "single-electron" corresponding to zone theory (independent electrons), and "doubled" state in which both electrons are rigidly bound together, moving

2077103

USSR/Nuclear Physics - Ionic Crystals Feb 52
(Contd)

conjointly within the lattice. Introduces conditions of cycling and computes number of "single" and "double" state electrons. Determines conditions of "doubling"-type state. Received 14 Apr 51.

2077103

VOL'KENSHTEYN, F. F.

Chemical adsorption on ionic crystals. F. F. Vol'kenshteyn (U.S.S.R. Phys. Chem., Acad. Sci. U.S.S.R., Moscow). *Zhur. Fiz. Khim.* 28, 1462-71 (1962); *cf. C.A.* 42, 1341i. — A math. discussion of the mechanism of chemisorption in the case of a univalent atom A adsorbed on an ionic crystal of the type M^+R^- . The atom A is attracted to a free lattice electron, forming a local plane of adhesion. To an extent depending on the distance of A from the crystal surface, this local plane is drawn toward the cond. zone; when A recedes to infinity, the plane merges with the zone. The migration of an electron from the cond. zone to the local plane of adhesion amounts to localization of the free electron near A; the greater the degree of localization, the deeper is the plane of adhesion. A homopolar bond is formed comprised of one electron each from atom A and the lattice. Without the free lattice electron chemisorption is impossible.

J. W. Loweberg, Jr.

10-13-54

mfj

VOL'KENSHTEYN, F. F.

USSR/ Chemistry - Adsorption

Card 1/1 : Pub. 40 - 4/22

Authors : Vol'kenshteyn, F. F.

Title : Electron processes during chemical adsorption. Part 1.-

Periodical : Izv. AN SSSR. Otd. khim. nauk 5, 788-794, Sep-Oct 1953

Abstract : The results of numerous works on the theory of heterogeneous catalysis, the purpose of which was to determine the elementary (microscopic) mechanism of chemical processes occurring on the surface of a crystal, were analyzed. The problem of adsorption and catalysis is assumed as a physical problem and considered from the viewpoint of the modern theory of the solid body. The problems of the electrons of the crystalline lattice, which take direct part in the surface of the crystal, are discussed. It was noted in several cases that these electrons not only take active participation but even control the chemical processes. Five USSR references (1947-1953). Graphs; drawing.

Institution : Academy of Sciences USSR, Institute of Physical Chemistry

Submitted : March 20, 1953

VOL'KENSHTEYN, F. F.

USSR/Chemistry - Adsorption; Nov/Dec 53
Catalysis

"Electron Processes in Chemical Adsorption,
Part II," F.F. Vol'kenshteyn, Inst Phys Chem,
Acad Sci USSR

Iz Ak Nauk SSSR, Otkn, No 6, pp 972-979

Develops a theory of adsorption phenomena based
on electron processes. Points out its importance
for the theory of catalysis. This is a contin-
uation of Part I of the article, published in Iz
Ak Nauk SSSR, Otkn, No 5, pp 788-794, 1953.

273T7

V. F. KENCHTAYN, E. F.

Chemical Abstracts

Vol. 48 No. 5

Mar. 10, 1954

General and Physical Chemistry

Theory of activated adsorption. I. F. F. Vol'kenshtein
(Inst. Phys. Chem., Acad. Sci. U.S.S.R., Moscow, U.S.S.R.)
Phys. Rev. 97, 108 (1953); U.S.S.R. 28, 108 (1953).—
Adsorption on an ionic crystal is discussed on the basis of
the hypothesis that free lattice electrons in the surface zone
of cond. act as adsorption centers. The no. of adsorption
centers increases with surface charge and with temp. The
kinetics has the character typical of activated adsorption,
although the potential barrier near the crystal surface is as-
sumed to be absent. II. *Ibid.* 167-77.—The hypothesis of
free electrons as adsorption centers leads to the Freundlich
adsorption isotherm with exponent $1/2$, although the surface
is assumed homogeneous, interaction between adsorbed
mols. is ignored, and disson. is absent. The differential
heat of adsorption is a function of the charge. Exposure of
the crystal to light of corresponding frequencies increases
the no. of adsorption centers, the adsorption capacity of the
surface, and the time rate of adsorption. Surface impuri-
ties of the acceptor type must decrease the adsorption rate
and capacity of the crystal; donor impurities increase them.
These results agree with a no. of exptl. data, e.g., the work
of Luyckx, *et al.* (*C.A.* 36, 5428; 38, 4516), with which the
elementary Langmuir adsorption theory is not consistent.
J. W. Loweberg, Jr.

VOL'KENSHTEYN, F.F.

Chemical Abst.
Vol. 48 No. 6
Mar. 25, 1954
General and Physical Chemistry

Activated adsorption on semiconductors. F. F. Volkenshteyn. *Uspekhi Fiz. Nauk* 50, 253-74 (1953). Activated adsorption, i.e. adsorption requiring activation energy, can be either chem. (involving exchange forces) or phys. (involving electrostatic forces). The probability that a gas mol. will become attached to an adsorption center is given by $\eta = e^{-e/RT}$ (e is activation energy). In the one-electron case of adsorption, the free electrons contained in the conduction band of the surface take an important part; in 2-electron adsorption an important part is played by the interaction of conduction electrons trapped in surface traps and gas atoms. In both cases adsorption centers are neutral atoms, M, in a layer of surface ions, M⁺. These atoms contain an unpaired valence reacting with the adsorbed material. Adsorption centers become localized on the surface by the adsorption process. Donors increase, acceptors decrease, the concn. of adsorption centers. Illumination by a wave length corresponding to the inner photoelec. effect increases adsorption. New adsorption centers are created when the surface is partially covered at the expense of free electrons in the cond. band. The adsorption law, $N \sim \sqrt{p}$, is due to the increase of adsorption centers with increasing surface coverage. This increase is a typical feature of the new theory. 10 references.

S. Pakswar

11-5-54

VOL'KENSHTEYN, F. F.

USSR/Chemistry

Card 1/1

Authors : Vol'kenshteyn, F. F.

Title : Two types of a homeopolar bond during chemical adsorption

Periodical : Zhru. Fiz. Khim, 28, Ed. 3, 422-432, March 1954

Abstract : Investigated are the processes of electron interchange between the surface of the adsorbent and adsorbed atoms. In other words the author investigated the role of the free electrons of the lattice during chemical adsorption. There are two possible types of a bond of a chemically adsorbed atom and a surface: 1) weak (mono-electron) and strong (di-electron) bond. In the state of a weak bond the free valence of an adsorbed atom remains unsaturated. Transformation into a strong bond is accompanied by the entrapment of the free electron of the lattice by the adsorbed atom. At this point the unsaturated valence of the adsorbed atom becomes saturated. A chemically adsorbed atom can change from one state into another. Eight U.S.S.R. references. Graphs.

Institution : Academy of Sciences U.S.S.R., Institute of Physical Chemistry

Submitted : April 28, 1953

VOL'KENSHTEYN, F.F.

USSR/ Chemistry Physical chemistry

Card : 1/1 Pub. 147 - 7/25

Authors : Bonch-Bruevich, V. L., and Vol'kenshteyn, F. F.

Title : Conception of the "heterogeneous surface" in adsorption theories

Periodical : Zhur. fiz. khim. 28/7, 1219 - 1224, July 1954

Abstract : The physical concept of a heterogeneous surface, in adsorption processes is elucidated. The electron processes occurring during adsorption, and, which may lead to certain deviations from the Langmuir adsorption laws, are discussed. It is stated that further development of the theory of heterogeneous surfaces depends upon the knowledge of the physics of heterogeneous surfaces, i.e., knowledge of the elementary mechanism of adsorption processes. Nine USSR references (1935 - 1954).

Institution : Acad. of Sc. USSR, Institute of Physical Chemistry and The Electro-technical Communications Institute, Moscow

Submitted : July 7, 1953

Vol'Kenshteyn, F. F.

USSR/Chemistry

Card 1/1 Pub. 147 - 22/27

Authors : Vol'kenshteyn, F. F.

Title : Comments on the report by Tolpin, John and Field

Periodical : Zhur. fiz. khim. 28/9, 1682-1683, Sep 1954

Abstract : Comments are presented on the report by J. G. Tolpin, G. S. John and E. Field entitled, "Advances in Catalysis", Vol. 5, p. 249-254 (New York 1953). It is claimed that the Americans have unjustly made certain corrections in a theoretical formula obtained by the author of the comments without first realizing that a certain value in the formula is negative and not positive. Two references: 1-USSR and 1-USA (1949 and 1953).

Institution : ...

Submitted : June 12, 1954

Vol'kenshteyn, F. F.

AF701597

TREASURE ISLAND BOOK REVIEW

AID 799 - S

F. F. VOL'KENSHTEYN (Institute of Physical Chemistry, Academy of Sciences, USSR)

DISKUSSIYA (Discussion). In Problemy kinetiki i kataliza (Problems of Kinetics and Catalysis), vol. 8. Izdatel'stvo Akademii Nauk SSSR, 1955. Section I: Effect of illumination on the adsorbability of solids. p. 68-69.

The papers of A. N. Terenin, I. A. Myashikov and S. Ya. Pshezhetskiy have been reviewed. It was experimentally shown in both papers that in some cases under the action of a light quantum, the bond connecting the adsorbed molecule and the solid compound, was ruptured; this results in the desorption of the adsorbed molecule. It was also established that desorption of molecules causes change in the electric conductivity of the crystal. Fig. 1 (p. 69) illustrates the mechanism of chemical adsorption of the O_2 - molecule on the semiconductor. One ref. (Russian) (1953). 1 diagram.

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AF701597

TREASURE ISLAND BOOK REVIEW

AID 806 - S

VOL'KENSHTEYN, F. F. (Institute of Physical Chemistry, Academy of Sciences, USSR)

NEKOTORYYE VOPROSY ELEKTRONNOY TEORII KATALIZA NA POLUPROVODNIKAKH (Some problems of the electronic theory of catalysis on semi-conductors). In Problemy kinetiki i kataliza (Problems of Kinetics and Catalysis), vol. 8. Izdatel'stvo Akademii Nauk SSSR, 1955. Section II: General problems of the theory of catalysis. p. 79-96.

Free valences on the surface of the catalysts, the adsorption of free atoms and radicals, reactivity of adsorbed atoms, the role of free valences in the adsorption of saturated molecules, and some types of heterogeneous reactions are covered in this paper. (based on studies carried out by the author with S. Z. Roginskiy, V. V. Voevodskiy, and N. N. Semenov). The author introduces the concept of crystal as a "polyradical", i.e., the crystal possesses free valences on its surface and, in addition, contains some other valences which can be opened ("made free") in the course of the reaction. The crystal acts as a catalyst in accordance with two rules: 1) the retention of the total number of valences and 2) the tendency of the valences to saturation. The radical

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VOL'KENSHTEYN, F. F., Nekotoryye voprosy.....

AID 806 - 3

mechanism of heterogeneous catalysis is just the chemical
aspect of mechanisms, based on the electronic theory. 9 ref.,
all Russian (1947-1955).

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TREASURE ISLAND BOOK REVIEW

AID 827 - S

VOL'KENSHTEYN, F. F. (Institute of Physical Chemistry, Academy of Sciences, USSR) DISKUSSIYA (Discussion). In Problemy kinetiki i kataliza (Problems of Kinetics and Catalysis), vol. 8. Izdatel'stvo Akademii Nauk SSSR, 1955. Section III: Connection between the electric conductivity and catalytic activity of semiconductors. p. 201-203.

Review of the relationship between electric conductivity and catalytic activity of semiconductors based on experiments reported in papers by K. I. Matveyev and G. K. Bouskov, p. 168-174; I. A. Myasnikov and S. Ya. Pshezhetskiy, 175-179; and V. I. Lyashenko and J. J. Stepko, 180-188.

In accordance with the electron theory, the catalytic activity of semiconductors depends on the concentration of electron gas on the surface. Under conditions of equilibrium, this concentration is connected with the concentration of electron gas inside the semiconductor.

Addition of oxygen to ZnO decreases the electric conductivity and inhibits the dehydrogenation of isopropyl alcohol. The

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VOL'KENSHTEYN, F. F., Diskussiia

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mechanism of the reaction is illustrated on p. 202. One reference
(Russian) (1951).

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TREASURE ISLAND BOOK REVIEW

AID 823 - S

VOL'KENSHTEYN, F. F. and V. B. SANDOMIRSKIY (Institute of Physical Chemistry, Academy of Sciences, USSR).

O SVYAZI MEZH DU KATALITICHESKIMI SVOYSTVAMI POVERKHNOSTI POLUPROVODNIKA I YEGO OB"YEMNYMI ELEKTRONNYMI SVOYSTVAMI (Connection between the catalytic properties of the surface and the space electron properties of semiconductors). In Problemy kinetiki i kataliza (Problems of Kinetics and Catalysis), vol. 8. Izdatel'stvo Akademii Nauk SSSR, 1955. Section III: Connection between the electric conductivity and catalytic activity of semiconductors. p. 189-197.

The establishment of electronic equilibrium between the surface and space of the semiconductor shows that the concentration of free valences on the surface depends on the characteristics of the space. In the case of small crystals, the characteristics of the surface do not depend on space, and, conversely, in larger crystals, the characteristics of volume do not depend on the surface. Adsorption on the surface of the crystal changes the concentration of the electron gas inside small crystals, thus affecting the electric conductivity. If atoms-acceptors are adsorbed by the surface of a semiconductor, the electric conductivity will

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VOL'KENSHTHEY, F. F. and V. B. SANDOMIRSKIY. O svyazi . . . AID 823 - S

decrease; the adsorption of atoms-acceptors on a hole-rich semiconductor will increase the conductivity. Five references, 4 Russian (1937-1955). One table, 3 diagrams.

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TREASURE ISLAND BOOK REVIEW

ALJ 832 - S

VOL'KENSITSEYN, F. F. and V. L. BONDH-BRUYEVICH (Moscow Electrical Communication Institute and Institute of Physical Chemistry, Academy of Sciences, USSR). PONYATIYE (NEODORODNOE POVERKNIENIE) I TEORIYAKH ADSORBSII (the concept of "nonuniform surface" in adsorption theories). In Problemy kinetiki i kataliza (Problems of Kinetics and Catalysis), vol 8. Izdatel'stvo Akademii Nauk USSR, 1955. Section IV: Nature of the active surface. p/ 218 - 223.

Studies conducted by the authors have been discussed from the viewpoint of the concept of "nonuniform surface" which take place during adsorption may result in deviation from Langmuir's regularities. The concentration of free atoms in semiconductors depends on temperature and concentration of the admixtures in the adsorbent crystal. When the electrons in the conduction zone of the adsorbent surface act as adsorption centers, their number depends on the number of atoms adsorbed. Not only electrons, but lattice defects as well may act as adsorption centers. The distribution functions is a characteristic of the entire system, i.e., adsorbent and adsorbate. Nine references, all Russian (1935-1954).

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VOL'KENSHTEYN, F. F.

Chem ✓ The role of free valencies in heterogeneous catalysis. V. V. Voevodskii, F. F. Vol'kenshtein, and N. N. Semenov. *Voprosy Khim. Kinetiki, Kataliza i Reaktivnoi Spetsializatsii, Akad. Nauk S.S.S.R.* 1955, 423-40. — A preliminary sketch of the principal features of a theory of catalysis. A catalyst crystal can be viewed as a single giant mol. that affects heterogeneous reactions in a way similar to that of free radicals in homogeneous reactions. In both cases, reactions proceed by essentially similar mechanisms. In all catalytic reactions the process is caused and directed by free valencies, and the catalyst plays a role not unlike that of a "radical". The phys. nature of free valencies on the catalyst crystal surface, and the different bond types between the adsorbed atoms and the crystal surface are discussed. The reaction mechanisms are based on the participation in the reactions of free valencies and of the heterogeneous radicals formed during the process on the catalyst surface. The introduction of a chain catalysis mechanism gives a novel explanation of the mechanism of acceleration caused by the catalyst. This acceleration may be a result of formation of free valencies that causes chain generation on the catalyst at much higher velocities than in the gas phase. A 2nd catalyst function may consist in the formation of heterogeneous radicals on the crystal surface, by way of which chain-growth reactions are realized. The chain-growth may frequently be impeded by the high endothermicity of the compds. formed in the elementary stages. When the chain development via the heterogeneous radicals happens to be energetically more probable, catalysts can greatly accelerate the process. A complete absence of information with regard to bond energies of single atoms and of at. groups with the catalyst may be the principal difficulty that at present interferes with the evaluation of velocity relations in elementary heterogeneous radical reactions. A rough evaluation of the heats of reactions at elementary stages makes such stages appear probable, but any concrete schemes must still be considered purely hypothetical. W. M. Sternberg

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VOL'KENSHTEYN, F.F.

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Color centers in crystals. F. F. Vol'kenshtein. *Uspekhi Nauch. Fot., Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 3, 20-0(1955).—Alkali metal chlorides were studied.
Birilla Mayerle

VOL'KENSHTEYN, F.F.; ROGINSKIY, S.Z.

Ionic bond in the chemical adsorption on semiconductors.
Zhur.fiz.khim. 29 no.3:485-495 Mr '55. (MIRA 8:7)

1. Akademiya nauk SSSR, Institut fizicheskoy khimii, Moscow
(Adsorption) (Semiconductors)

VOL'KENSHTEYN, F.F.

SUBJECT USSR / PHYSICS
AUTHOR VOL'KENSTEYN, F.F.
TITLE Semiconductors as Catalyzers of Chemical Reactions.
PERIODICAL Usp.fis.nauk, 60, fasc.2, 249-293 (1956)
Issued: 12 / 1956

CARD 1 / 2

PA - 1699

This work investigates the basic phenomena and the basic notions of catalysis and enumerates the main problems connected with the utilization of semiconductors as catalyzers. On the All-Soviet Conference on Semiconductors (Leningrad, November 1955), a special department was installed for "Semiconductor Catalysis". The present survey is arranged as follows: Activity and selectivity of a catalyzer, adsorption as a stage of catalysis, electron processes on the occasion of chemisorption, various types of binding connected with chemisorption, the reactivity of adsorbing molecules, the adsorptiv capacity of the surface, catalytic activity and the part played by admixtures, catalytic activity and electric conductivity.

Summary: The facts mentioned in this article supply a sufficient amount of evidence to show that the catalytic properties of semiconductors are connected with the electron processes occurring on the surface of the semiconductor and are, after all, caused by them. Therefore, the chemical problem of catalysis may at the same time be described as a problem of semiconductor physics. The catalytic process actually has an electronic mechanism. The electron theory of catalysis, which is based on semiconductors, aims at explaining the elementary mechanism of the catalytic act. This theory is based

Usp.fis.nauk, 60, fasc.2, 249-293 (1956)

CARD 2 / 2

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on the one hand on the theory of semiconductors, and on the other on the theory of chemical bindings; at present it is in the act of being developed. It may be said that we are faced with a certain tendency of theoretical and experimental research within the field of catalysis. This new tendency came into being about 10 years ago in the Laboratory for Catalysis of the Institute for Physical Chemistry of the Academy of Science in the USSR by the initiative of S.Z.ROGINSKIJ. Several years later this tendency began to spread also outside the Soviet Union, and at present quite a number of foreign (i.e. non-Soviet) laboratories and also some research workers (physicists and physico-chemists) are working in this field.

It is a characteristic feature of our times that experiment lags a little behind theory, and this is particularly the case with Soviet works. Several theoretical prognoses have hitherto not been confirmed by experiment. Furthermore, such experimental material as might serve as a basis for theoretical research is as yet inadequate. There exists as yet no theory by means of which the physical mechanism of catalytic processes might be explained. The so-called electron theory of catalysis is now about to venture upon the first stages of development in this direction.

INSTITUTION:

Vol'kenshtein, F. P.
Distr: 4Elj3/4Elsp

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/ Different types of bonds in chemical adsorption on semi-conductors. F. P. Vol'kenshtein. *Izvest. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1957, 018-23. Theoretical. Chem. adsorption is considered under the assumption that the adsorbed mol. and the lattice of the adsorbent form a single quantum-mech. system, which can be considered as a chem. compd. However, this type of compd. is characterized by the presence of different types of bonds.
J. Ravtar Leach 111

101 KENSHTEYN, F. F.

Distr: 4Elj/4Elc

Mechanism of the catalytic action of semiconductors.
F. F. Vol'kenshteyn. *Izvest. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1957, 924-8; cf. preceding abstr.; *C.I. S.*, 2201b.—Theoretical. The adsorption of satd. mols. was discussed from the standpoint of the specific role of the catalyst. The conversion of mols. into surface radicals takes place through the use of the free valences of the catalyst surface. The electrons and the holes of the crystal lattice serve the function of these free valences. J. R. L.

VOL'KENSHTEYN, F. F.

9842* (Russian.) Dissociation Mechanism of Diatomic Molecules During Adsorption on the Surface of a Semi-Conductor. *Mekhanizm dissiatsii dvukhatomnoi molekuly pri adsorbtzii na poverkhnosti poluprovodnika. F. F. Volkenstein, Izvestiia Akademii Nauk SSSR, Otdeleniia Khimicheskikh Nauk, no. 2, Feb. 1957, p. 143-156.*
 A study of adsorption of a diatomic molecule consisting of atoms having one valence electron each. The free electron of the lattice causes a rupture of the valence bond between the atoms, forming the molecule and a sorption to the dissociation products.

4-J. Cahn
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VOL'KENSHTEYN, F.F.

Charging the semiconductor surface during adsorption. Vest. Mosk.
un.Ser.mat. mekh. astron. fiz. khim. 12 no.4:61-78 '57.

(MIRA 11:5)

1.Kafedra fiziki dlia khimicheskogo fakul'teta universiteta i
Institut fizicheskoy khimii AN SSSR.
(Adsorption) (Semiconductors)